

## CHAPTER 25

# Cultural-Historical Approaches to Designing for Development

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The goal of this chapter is to summarize theory and research descended from Vygotsky and his followers that takes seriously the idea that practice is essential for testing and improving theory. We refer to this approach as “cultural-historical activity theory” (CH/AT) (Cole, 1996; Engeström, 1999; Engeström, Miettinen, & Punamäki, 1999; Roth, Hwang, Goulart, & Lee 2005).

This approach to theory and practice, which is frequently traced back to Marx was clearly articulated by Vygotsky, for whom the use of Marxism in psychology was a life-long concern:

*Practice pervades the deepest foundations of the scientific operation and reforms it from beginning to end. Practice sets the tasks and serves as the supreme judge of theory, as its truth criterion... The most complex contradictions of psychological methodology are transferred to the ground of practice and only there can they be solved. There the debate stops being fruitless, it comes to an end. (Vygotsky, 1927/1997: 305–306)*

In the century since Vygotsky wrote these ideas, mainstream psychology, which has generally accorded culture only a peripheral role in human nature, has firmly institutionalized precisely the division between theory and practice (“basic *versus* applied research”) against which Vygotsky was arguing. Nevertheless, we believe that Marx and Vygotsky were correct – the implementation of theory in practice is not a marginal scientific goal in the study of human development – it is essential to understanding the complex interplay of different life processes, “in life,” not just in theory. As Engeström (1993: 98) put it, “The epistemology of activity theory transcends the dichotomy between theory and practice.”

### Cultural-Historical Activity Theory (CH/AT)

Cultural-historical activity theory (CH/AT) brings together ideas associated with the names of L. S. Vygotsky, A. R. Luria, and

A. N. Leontiev. It has been common in recent years to emphasize differences between Vygotsky and Luria, on the one hand, and Leontiev on the other (van der Veer & Valsiner, 1991). According to such interpretations, Vygotsky and Luria are best associated with the principle that the distinguishing characteristic of specifically human psychological functions is that they are culturally mediated: "The central fact of human existence is mediation" (Vygotsky, 1997: 138). By contrast, so the story goes, Leontiev believed that his colleagues overemphasized the cultural mediation of thought and underemphasized the embeddedness of thought in human activity. It might be argued that a significant disagreement exists to this day among those who consider Vygotsky and his colleagues as a starting point for constructing a theory of human development and those who start with Leontiev (1978). According to this line of interpretation, those who follow Vygotsky have focused attention on processes of mediation, adopting "mediated action" as a basic unit of analysis (Wertsch, del Rio, & Alvarez, 1995; Zinchenko, 1985). By contrast, followers of Leontiev are said to choose "activity" as a basic unit of analysis (Engeström, 1987; Kaptelinin, 1996).<sup>1</sup>

The basic impulse underlying a CH/AT approach is to reject this either/or dichotomy. Instead, adherents of a CH/AT perspective argue that whatever their disagreements, Leontiev (1981) readily acknowledges the constitutive role of cultural mediation in his account of activity while Vygotsky insisted on the importance of activity as the context of mediated action (1997). In similar fashion, one sees contemporary scholars who are seen as somehow in opposition with each other on this fundamental point adopting an "and/both" not an "either/or" approach. So, for example, James Wertsch argues for "mediated action in context" as a basic unit of analysis while Yrjö Engeström argues that "the activity is the context" and (as we shall see) pays great attention to principles of mediated action in both his theory and in his empirical research. While the presumably

opposing views weight different aspects of the dynamic system of development differently, or view them from a slightly different perspective in their overall approaches, they treat activity and mediation as two aspects of a single, whole in human life world.

### Some Basic Principles Used in CH/AT-Inspired Intervention Research

Keeping in mind that there are a variety of views on important issues among those identified as CH/AT theorists, the following are some theoretical principles generated from this position that have been tested in the intervention studies we review in this chapter.

1. *Mediation through artifacts.* The initial premise of the Russian cultural-historical school was that human psychological processes entail a form of behavior in which material objects are modified by human beings as a means of regulating their interactions with the world and each other. As A. R. Luria put it, artifacts incorporated into human action not only "radically change his conditions of existence, they even react on him in that they effect a change in him and his psychic condition" (Luria, 1928: 493).

As a result of acquiring this "cultural habit of behavior," human beings begin to regulate themselves "from the outside." This characteristic of human behavior gives rise to the *method of double stimulation*. An early application of this method was to provide an adult suffering from Parkinsonism with bits of paper, by means of which he was able to walk across a floor (Luria, 1932). It has subsequently been widely used in designing methods for re-mediating the behavior of adults with brain damage, or mentally retarded children (Amano, 1999; Luria, 1979). As we see below, it has become a central principle guiding research on the development of work practices among adults (Engeström, 2005). We will discuss double stimulation in more detail later in this chapter.

2. *Activity as the essential unit of analysis.* The complementary basic premise of the cultural-historical approach, adopted from Hegel by way of Marx, is that the analysis of human psychological functions must be situated in historically accumulated forms of human activity. Unfortunately, the meaning of the term, activity, no less than the term culture, is a bone of contention among scholars from different disciplines and national traditions.<sup>2</sup> According to A. N. Leontiev,

*Human psychology is concerned with the activity of concrete individuals, which takes place either in a collective – that is, jointly with other people – or in a situation in which the subject deals directly with the surrounding world of objects – for example, the potter's wheel or the writer's desk. [...] With all its varied forms, the human individual's activity is a system in the system of social relations. It does not exist without these relations. The specific form in which it exists is determined by the forms and means of material and mental social interaction (Verkher) that are created by the development of production and that cannot be realized in any way other than the activity of concrete people. (1981, 47)*

Unfortunately, the USSR was not a place where social scientists were easily permitted to conduct research on the wide range of activities that the theory specified as its basic units of analysis, let alone the larger social system. Although restricted, the early Russian CH/AT theorists demonstrated that at least in some institutional settings it was possible to make activity a genuine object of study while at the same time paying close attention to the processes of mediation with which activity is mutually constituted. Contemporary research has enormously broadened the range of activities and institutions to which scholars have been able to turn their attention (Hedegaard, Chaiklin, & Jensen, 1999; Engeström, Lompscher, & Rückriem, 2005).

3. *The cultural organization of human life.* Implied, but not made prominent in our discussion of mediation and activity is that both

concepts imply the centrality of culture to human life. Culture is present in the form of the tools, signs, rituals, and so on that mediate human activity. It is simultaneously present in all the symbolic forms that have accumulated over the social group's history, whether that history is of long or short duration. Lotman (1989) referred to this totality of meaning making materials, the "semiosphere," which he defined as "the semiotic space necessary for the existence and functioning of languages."

In some forms of intervention, culture is treated as a locally emerging activity system involving a briefer stretch of history such as the participants at English football matches or in an afterschool club (Nocon, 2004). In this latter case, the term "idioculture" is especially helpful. Adopting Gary Alan Fine's useful notion:

*An idioculture is a system of knowledge, beliefs, behaviors, and customs shared by members of an interacting group to which members can refer and that serve as the basis of further interaction. Members recognize that they share experiences, and these experiences can be referred to with the expectation they will be understood by other members, thus being used to construct a reality for the participants. (Fine, 1987, 125)*

4. *Adoption of a genetic perspective.* As Wertsch (1985) points out, Vygotsky used the notion of "genetic" in the sense of seeking the origins of current phenomena by studying the history of the phenomena in question.<sup>3</sup> This general principle has several implications for CH/AT-inspired intervention research, depending upon the nature of the intervention involved.

A) *Interventions Must Last for an Appropriate Amount of Time.* An important implication of a commitment to the use of genetic methods with respect to formative interventions is that they are unlikely to be brief forays into the field followed by an intense period of data analysis and writing, as is often the case with laboratory

experiments. Rather, the duration of the experiment must be appropriate to the time course of the "formative" (developmental) processes under examination. In the examples to be reviewed here, the formative experiments/interventions lasted for a period varying between several months and several years.

*B) Taking account of chronological age.* In so far as one is interested in psychological analysis, it seems obvious that intervention strategies need to take into account the chronological age of the participants whose activity is under study. It makes a difference if one is seeking to test the efficacy of a new form of curriculum with preschoolers, high school students, or working adults. In addition to the obvious fact that as children grow from birth to maturity, and the capacities of adults change as they grow older, early CH/AT theorists suggested that it is helpful to conceive of conventional age periodization in terms of the idea of its leading activity.

According to Elkonin (1971), traditional development stages are best conceived of in terms of the kinds of activity that dominate the lives of people at a given age. Associated with each leading activity is a particularly potent source of motivation. As Leontiev summarized the idea,

*Some types of activity are the leading ones at a given stage and are of greatest significance for the individuals' further development and others a subsidiary one. We can say, accordingly, that each stage of psychic development is characterized by a definite relation of the child to reality that is the leading one at that date and by a definite type of leading activity. (Leontiev, 1981, 395)*

Although the terminology differs somewhat according to the particular writer, a rough correlation between typical stages of development with canonical stage theories would read roughly like the following:<sup>4</sup>

- The initial leading activity is coordination with the group into which one is born.

- The "preschool era" in conventional textbooks is the era when play is the leading activity.
- During what is conventionally referred to as middle childhood, formal learning becomes the leading activity.
- Late childhood and Adolescence are delicately referred to as the age when peer relations become the leading activity.
- Maturity, roughly past the age of 18–19, has work as its leading activity.

Vygotsky, Luria, and Leontiev, were of course, conducting research on the leading activities that were being institutionalized in the USSR at the time. This work was hampered both by the fact that serious research on the world of work was ideologically restricted and by the age-graded segmentation of people's lives in the country where they lived. On a world scale, schooling is not universal nor is being part of an industrialized political economy. It is no surprise, then that evidence from various parts of the world demonstrates important cultural variations in the timing and content of leading activities in different societies and markedly different forms of organizing labor, factors that are of obvious importance in the design of formative interventions (Gaskins, 1999; Rogoff, 2003).

What is constant despite such variation is that the organization of people's activities is arranged in such a way that the cultural knowledge that is made manifest in everyday activities of young (or inexperienced) people is simultaneously the form of the leading activity characteristic of the social group. A leading activity represents a socio-cultural group's notion of the behaviors and sequences of behaviors that *should* be manifested by anyone who is reaching the age or level of experience where "that can be expected."

5. *Social origins of higher psychological functions.* Vygotsky argued that all means of cultural behavior (behavior mediated by cultural artifacts) are social in their essence. They are social too, in the dynamics of their

origin and change, as expressed in what Vygotsky called "the general law of cultural development":

*Any function in children's cultural development appears twice, or on two planes. First it appears on the social plane and then on the psychological plane. First it appears between people as an interpsychological category and then within the individual child as an intrapsychological category. (Vygotsky, 1981, 163)*

While Vygotsky was writing specifically about children, the same principle applies at any age. If we combine the idea of leading activities and the idea that developmental change is promoted by having people with different kinds of knowledge and ability engage jointly in a variety of culturally organized, sanctioned activities, it produces an apparently clear design strategy: create interventions in which more knowledgeable and less knowledgeable people and their cultural tools engage each other. The issue then becomes *how* do they engage each other?

6. *The ethical and strategic contradictions of intervention research.* Consideration of the social circumstances most conducive to promoting developmental change makes it clear that in using a particular theory, with its particular judgments about potential desirable futures, one is not "just testing out a theory." By virtue of the intervention's location at the level of a culturally organized activity it is partially constitutive of that activity. The values of intervention researchers, by virtue of their infusion into those activities, become a part of the ensuing developmental process. As we shall see, different research strategies can usefully be seen as different responses to the dilemma of needing to influence the futures of others as means of testing CH/AT theory.

In short, the relationship between researchers and other intervention participants needs to be a part of the analysis. It must also be kept in mind that non-researcher activity participants are them-

selves likely to be distinguished by age, social status, authority, and degrees of experience with respect to the activity, to name but a few relevant characteristics. The "formative process" is itself a form of joint mediated activity in which critical analysis of the notion of "more capable peer" should be part of the analysis.

Consequently, a CH/AT approach to implementation research requires researchers to attend not only to their theory and data, as one does in the study of genetic effects among fruit flies. In addition it is also necessary to attend to the quality of that practice as it is evaluated by the community that plays host to the intervention. Without the community's support, the intervention, no matter how well it works out "in theory" will ultimately fail. The medical dictum remains fully in force: Do no harm. There is an ethical dimension to practices that involve one person's intervention into the lives of others.

### Example Intervention Studies Combining Theory and Practice

It is not possible in a chapter of this length to provide an exhaustive account of the body of formative-experimental research that places cultural mediation and activity as its conceptual center. Such an account would take systematically into consideration a number of ingenious interventions that were carried out during the middle decades of the 20th century, many of them by researchers inspired by Kurt Lewin's ideas. Similar in many ways to CH/AT, Lewin's version of genetic field theory encouraged culturally informed implementations, but employed a vocabulary from social psychology where culture is rarely used, but the relevant concepts appear in the form of "norms" and "values." Sherif and Sherif's (1956) text on social psychology, for example, provides a wide example of studies focused on the role of norms, values, and conventions as key constituents of the small group structures. Social Psychologists of this kind

clearly rendered their central ideas empirically testable through the construction of specially designed social settings and theoretically motivate changes in those settings (such as the famous Robber's Cave experiment). This research, along with various lines of action research needs to be revisited for the rich insights concerning intervention research centered on questions of culture and development that they can provide.

However, our focus here is on intervention research that grows out of the CH/AT tradition. Recognizing that space does not permit us the luxury of deep and broad coverage simultaneously, we have chosen to highlight three research programs that differ in the culture and historical circumstances in which they were carried out, the particular populations and institutions that are the focus of the intervention, and the CH/AT principles that they highlight as a guide to their intervention strategies. We conclude by placing this research in the overall landscape of culturally informed developmental interventions. Their combination appears to provide an interesting way to "triangulate" on the role of culturally organized activity in human development.

### The Elkonin – Davydov Teaching/Learning Interventions<sup>5</sup>

Perhaps the domain where Russian CH/AT ideas have been most frequently put to the test using formative experimentation is the intervention research program initiated and instituted by D. B. Elkonin and V. V. Davydov (Davydov, 1988 a, b, c; Zuckerman, 2005).<sup>6</sup> Through their influence at the Russian Institute of Psychology in the Academy of Pedagogical Developmental Sciences they were able to organize several multi-year formative experiments, sometimes referred to as "teaching/learning" experiments, as a means of implementing state mandated school reforms (Kaminski, 1994; Markova, 1979; Yanchar, 2003). This line of work is still being expanded by Elkonin and Davydov's

Russian students (Zukerman, 2003) and several non-Russian scholars (Hedegaard & Lompscher, 1999; Schmittau, 2003a, b).

Two theoretical propositions lie at the heart of the Elkonin-Davydov approach, which entail additional CH/AT principles when theory and practice are combined. First, there is the position, championed especially by Davydov, that knowledge formation follows the path of "ascending from the abstract to the concrete" that is intimately linked to the particular conceptual content to be mastered. This general epistemological approach is derived from the way in which Karl Marx formulated a comprehensive, concrete theory of capitalism from the abstract "germ cell" or "kernel" of the commodity as a contradictory unity of use value and exchange value (see Ilyenkov, 1982). Davydov (1988) summarized how this method could be a powerful strategy of learning and teaching in the following terms:

*When moving toward the mastery of any academic subject, schoolchildren, with the teacher's help, analyze the content of the curricular material and identify the primary general relationship in it, at the same time making the discovery that this relationship is manifest in many other particular relationships found in the given material. . . . When schoolchildren begin to make use of the primary abstraction and the primary generalization as a way of deducing and unifying other abstractions, they turn the primary mental formation into a concept that registers the "kernel" of the academic subject. This "kernel" subsequently serves the school children as a general principle whereby they can orient themselves in the entire multiplicity of factual curricular material which they are to assimilate in conceptual form via an ascent from the abstract to the concrete." (Davydov, 1988, Part 2, 22–23)*

Second, and closely related to the first, is the idea of leading activities, reformulated in terms of the sequencing of the curriculum across grade levels to take account of age-expectant activities and associated sources of

motivation (Elkonin, 1971). In the Elkonin-Davydov approach these two ideas are combined such that the logical sequence of curricular content is meshed with leading activities in order that what children need to learn in order to fill in their initial, general, but empty abstractions as they rise to more complex forms of concrete reality also satisfies needs associated with the leading activities that will motivate them to engage in the hard work of dealing with problems for which they need to come up with new solutions.

Davydov argued that the process of ascending from the abstract to the concrete leads to a new type of theoretical concept, to theoretical thinking, and to theoretical consciousness. By "theory" he meant "an instrumentality for the deduction of more particular relationships" from a general underlying relationship, not a set of fixed propositions (Davydov, 1988, Part 2:23). The classic example that inspired Davydov is Ilyenkov's (1982) analysis of commodity, the contradictory unity of use value and exchange value, as the germ cell of the socio-economic formation of capitalism.

In summary, the Elkonin-Davydov teaching/learning curriculum was designed in each subject matter area in such a way that it was structured around theoretical concepts appropriate to that domain and that classroom life was organized to insure that the forms of activity and concrete materials were used in an optimally motivating and intellectually effective way. This curriculum has been implemented in a number of subject matter domains from which we have chosen to emphasize mathematics as an example because it is particularly well worked out and has attracted the attention of mathematics educators in many parts of the world (Davydov, 1988; Schmittau, 2003).

### The Example of Mathematics

As applied to the domain of mathematics, the Elkonin-Davydov curriculum is designed to provide students with the clearest possible understanding of the concept of real

number. This initially abstract concept needs to be introduced at the very beginning of instruction and then must be "filled in" with a great variety of concrete instantiations of the initial germ cell/abstraction. Davydov describes the general principles of this "filling-in" process as follows:

*The children's assimilation of the basic idea of the concept of real number should begin with the mastery of the concept of quantity and with the study of the general properties of the quantity. Then all kinds of real numbers can be assimilated on the basis of the children's mastery of the modes whereby those properties are concretized. In this case, the idea of real number will be "present" in the teaching of mathematics from the outset. (1988: 67)*

Choosing real numbers and measurement of quantity as the germ cell of mathematics education contrasts sharply with the curriculum in other countries that begins by teaching children to count and to support their mastery of the basic arithmetical operations through the introduction of a wide variety of empirical examples. The Elkonin-Davydov approach also involves a wide variety of empirical examples. But they are organized to serve as concrete manifestations of the initial, "germ cell" abstraction of quantity. And, importantly, learning about quantity and relative quantity precedes the introduction of concepts of number, counting, and arithmetic.

In order to realize these ideas in actual curriculum units, the iconic Elkonin-Davydov mathematics curriculum begins roughly as follows: Initially the children are asked to compare the quantity embodied in various pairs of objects and to say whether the amounts (length, volume, etc.) are equal or not equal and if unequal, which is greater in the aspect of quantity involved. The differences between the objects are sufficient so that the children can easily make this judgment.

Then they are shown pairs of objects that are relatively similar in quantity so that they must pick up the object pairs and place them next to each other such that they are aligned

at one end and then look to see whether the other ends match – when both ends match, the objects are “equal in length,” and so on. Many examples are given using various object attributes until the children can make such comparative judgments automatically, as an operation.

Next the children might be presented a new set of problems with objects that cannot be physically moved and aligned such as two line segments on two blackboards at opposite ends of the room and asked to compare them in length. The operations that worked earlier are no longer usable: the child cannot pick up bookcases or a line segments made of chalk and carry them across the room in order to line them up. Now the role of the teacher is to arrange for the children to work on the problem together until, perhaps with some intervention by the teacher, they come up with using the idea of a mediating tool such as a piece of string or a stick that is the same length as one of the chalk line segments. They can then carry the mediating “yard stick” across the room and make the comparison as before, but now through the mediated action of measuring.

Now the idea of measurement as the ratio of the length of the mediating tool to the object(s) being measured is introduced. At first the examples picked are whole numbers but later they will be fractions or even irrational numbers. As Jean Schmittau (2003), who has conducted a good deal of work Davydov’s theory and methods comments, when, in later grades, the children are introduced to fractions and irrational numbers, they are not required to reconceptualize number, unlike curricula that start with counting whole numbers, where an entirely new set of operations is needed each time a new concept of number is introduced. Schmittau provides additional examples, extending her observations to multiplication and division that students encounter in later grades, to affirm the effectiveness of Davydov’s germ-cell theory approach. Zuckerman (2005) shows how this approach produces results that compare favorably with alternatives using contemporary international testing standards.

### Expanding on the Elkonin-Davydov Approach

The conceptual structure and sequencing of the curriculum is not a magic bullet that students master and teachers implement with ease. First, it is important to emphasize that the special conceptual structure of the curriculum is complemented by extensive use of graphic devices (including simple algebraic equations, and varied opportunities to make physical models that embody the mathematic relations involved). Second, children are not expected to be independent learners at the start of the process. In fact, the ability to work collaboratively, to create intellectual divisions of labor in the service of allowing every participant to solve the problem, is assumed to require nourishing along with the particular conceptual content involved (Rubtsov, 1991; Zuckerman, 1994).

This approach also requires that children be motivated to tackle the issues that are laid before them, the socially inherited cultural tools of the academic disciplines. In her research at a Moscow school that was the center of developmental education research during Elkonin and Davydov’s lifetimes, Zuckerman (1994, 2003) has focused particularly on organizing instruction so that it was both motivating to the students and cognitively organized in the theoretically appropriate way. This challenge could be met, she believed, if instruction could be organized so the child learned the “tasks, methods, and means and devices of the actual kinds of social activity in which he can be expected to engage in later life” (pp. 4–5). In a manner reminiscent of Dewey, she argued that to produce appropriate and sufficient internal motivation, the assignments should draw upon “the context and structure of the kinds of activities that children can expect to engage in later” (p. 5).

Over and above being motivated and mastering domain specific content, success in the curriculum, because it is focused on creation of theoretical knowledge, depends upon children engaging in active inquiry and an ability to reflect upon their own problem



solving efforts – an ability that it is fashionable to refer to as metacognition in the current literature on cognitive development (Hartman, 2001).

The purpose and the entire methodology of the Elkonin-Davydov curriculum is “to develop educated, knowledgeable students who have mastered the cultural values of the past, yet are capable of overcoming the confines of cultural traditions by going beyond generally accepted solutions and frameworks to solve novel problems” (Zuckerman, 2003, 195). But consider what this means, even in the classroom. It is the rare teacher, never mind the rare statesperson, who wishes to be questioned at every turn about the “cultural values of the past.” After all,  $2 + 2$  equals 4, and to question why is to display stupidity, or its often misidentified cousin, ignorance. A theoretically founded, inquiry-based educational curriculum is designed precisely to develop incessant questioning, a critical, reflective person who produces novelty through mastery and who risks being judged a fool.

Davydov's work was initially a key inspiration for the Finnish group of activity theorists who have expanded the use of the theory to the world of work. Foundational ideas of developmental work research were systematically laid out in Engeström's book *Learning by Expanding* (1987, 1998). Subsequently, the work led to an intervention toolkit based on the principle of double stimulation.

### Developmental Work Research: Focusing on the Method of Double Stimulation

Vygotsky described the idea of double stimulation as follows:

*The task facing the child in the experimental context is, as a rule, beyond his present capabilities and cannot be solved by existing skills. In such cases a neutral object is placed near the child, and frequently we are able to observe how the neutral stimulus is drawn into the situation and takes on the function of a sign. Thus, the child actively*

*incorporates these neutral objects into the task of problem solving. We might say that when difficulties arise, neutral stimuli take on the function of a sign and from that point on the operation's structure assumes an essentially different character.*

*By using this approach, we do not limit ourselves to the usual method of offering the subject simple stimuli to which we expect a direct response. Rather, we simultaneously offer a second series of stimuli that have a special function. In this way, we are able to study the process of accomplishing a task by the aid of specific auxiliary means; thus we are also able to discover the inner structure and development of higher psychological processes. (Vygotsky, 1978, 74–75)*

The application of the method of double stimulation by Russian psychologists tended to focus on individual behavior of children or medical patients who were provided with potential tools to carry out tasks that were beyond their current capabilities (for a concise summary of early studies, see Luria, 1979). An extension of this idea to collective behavior with adults indicates how the basic logic of the method can be extended as a tool of intervention research.

The Finnish developmental work researchers have used a generalization of the method of double stimulation as a key element in their intervention research, focused on development of adult work practices (Engeström, 2005). They create what they term “Change Laboratories,” temporary activity systems that are set up within existing organizations (e.g., hospitals, schools, factories, banks).

The events that transpire in the Change Laboratory are organized to position the intervention as a “tool” chosen by the subject (the people working in that institution) as a means of solving some perceived problems in the ongoing regime of work. At this high level of abstraction, the Change Laboratory occupies the role of the “mediating artifact” within a socially organized, group with which to engage in the “cultural habit of behavior” (Vygotsky, 1929). In its abstract form, a Change Laboratory can

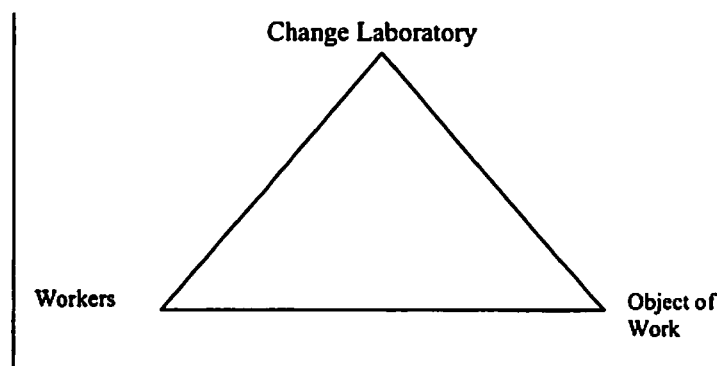


Figure 23.1. Basic mediational triangle with the Change Laboratory in the Position of the mediator.

be represented by the archetypal mediating triangle (Figure 23.1). But the Change Laboratory is not a stick or a word, or a pencil, it is a complex set of artifacts and procedures organized to serve as a tool for practitioners to change the conditions of their work. Engeström has diagrammed the prototypical layout of a change laboratory space in the following diagram (Figure 23.2).

A central element within a Change Laboratory-as-auxiliary stimulus is a set of three writing surfaces, each of which has three "layers" representing the past, the present, and the future. Each set of three-

layered writing surfaces is used for representing the work activity in a different way. One is called a "mirror" that is intended to represent to the participants critical examples of their current difficulties as manifested in recordings of particularly problematic situations and disturbances in routines as well as novel innovative solutions. This surface represents the 'first stimulus' in Vygotskian terms.

The second set of writing surfaces represents a conceptually mediated image of the participants' situation using models such as Engeström's expanded triangle of systems of

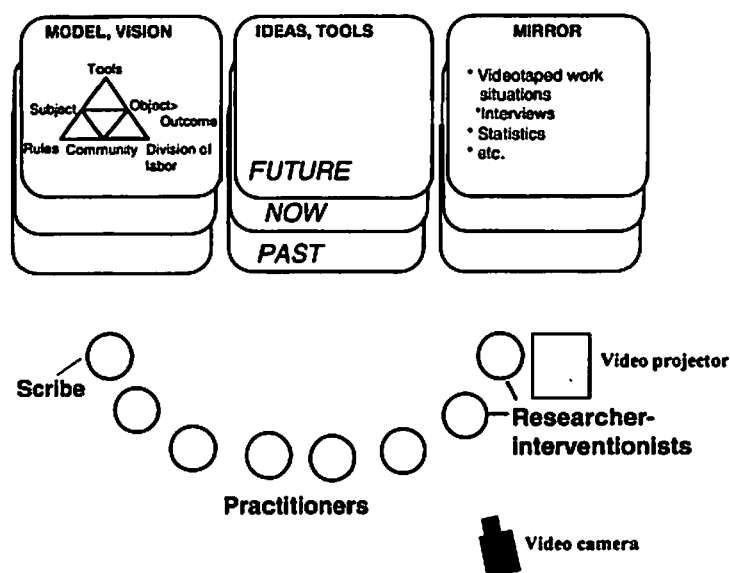


Figure 23.2. The prototypical layout of a Change Laboratory.

activity (Engeström, 1987, 78). Conceptual models are filled by participants with specific contents and used as tools for interpreting the contradictions behind current troubles in a more systematic, historically specified and generalizable way. Engeström refers to this as the "model/vision" space, where people use models of their past and present circumstances to envision how the future might be organized to differ in intended ways from the present and past. This surface represents the "second stimulus" in Vygotskian terms.

The third surface, physically located in the middle of the first two surfaces, is for recording the participants' ideas about what sorts of tools that might be used to deal with their problematic situation and to record intermediate, partial, solutions. Here participants might record schedules or flowcharts of their work processes, diagrams of organizational structures, ways of categorizing responses to interviews, etc. Engeström notes that in this intermediate zone, they might try out their ideas by making up simulations or by engaging in role-playing. The participants in a Change Laboratory (including practitioners, a scribe selected from among them, and the researcher/interventionists) ordinarily sit at tables where they can see the three writing/drawing surfaces, watch videotapes of their prior interactions, and see and interact with each other. The videotaping is important because videotaped work situations are typically used as material for the "mirror" part of the laboratory sessions. Each session is also videotaped for research and to facilitate the reviewing of critical laboratory events in subsequent sessions.

The Finnish researchers organized this array and sequence of mediating tools on the theoretically reasonable assumption that "as the participants move between the experiential mirror and the theoretical model/vision, they also produce intermediate ideas and partial solutions, to be tested and experimented with" (Engeström, Virkkunen, Helle, Pihlaja, & Poikela, 1996: 12). As this sequence is implemented, the practitioners move from a recognition of

their past and currently conceived problems and arrive at a new vision of those problems and their solution, a model and plan for future action.

Engeström and his colleagues refer to such sequences as cycles of "expansive learning" that are induced by interacting with the world through the Change Laboratory. Overall, a cycle is likely to require ten or twelve weekly sessions followed by one or two follow-up sessions a few months later. Then it is time to begin the process once again, leading, in successful circumstances to a "spiral of development." One cycle often leads to the next one, and within the cycles there are smaller cycles of problem solving and learning.

The researchers do not envision this process of development as a smoothly flowing, seamless sequence. It is, rather, always bedeviled by contradictions, breakthroughs, "double binds," adjustment, and resistance. But it is a process that embodies, however imperfectly, the collective agency of the practitioners involved.

Change Laboratory interventions have been conducted in dozens of variations since the first prototypes were tested in 1995. The initial focus on a single organizational unit as a spearhead of development has been complemented with "Boundary Crossing Laboratories" with participants from multiple collaborating organizations (Engeström, Engeström, & Kerosuo, 2003) and "Competence Laboratories" which put frontline practitioners and their managers in intense dialogue with one another (Ahonen, Engeström, & Virkkunen, 2000; Virkkunen & Ahonen, 2004).

Change Laboratories are judged by their practical outcomes. These outcomes are not primarily understood in terms of traditional cognitive variables. Practitioners are interested in actual changes in their work practices, including new objects, tools, rules, and divisions of labor. Thus, the creation and practical testing of the "care agreement" toolkit for the negotiated collaborative care of patients with multiple illnesses and multiple caregivers in the Helsinki area may be judged in terms of the actual utility of

the artifacts named "care agreement," "care map" and "care calendar" (Engeström, 2001). These tools, when used by practitioners, are judged by their potential to reduce gaps, overlaps, and fragmentation in the care of concrete patients. They are materially palpable learning outcomes.

Collective learning outcomes in Change Laboratory processes may also be assessed using such indicators as transformations over time in the quality of discourse within the community of practitioners. Thus, the Change Laboratory process conducted among the teachers of a middle school led to a qualitative shift in the way the teachers talked in their meetings about students. The researchers followed the Change Laboratory process and the subsequent implementation of its results for a period of 18 months. At the beginning, the teachers talked about their students in predominantly negative terms, as lazy and incompetent.

"Half of the students will be like that, they'll skip the whole idea. I have an oral presentation assignment at the moment, one student has held a presentation, and others have skipped it. This is what they will always do."

Toward the end of the process, positive talk about students as energetic and competent increased radically and remained at a high level.

"Well, I thought about someone, for example in my class, that she or he at least will definitely not do it. And then there have been these positive surprises, the person has actually produced a project, and a good one, too. Students who have otherwise been doing pretty poorly, and have been absent a lot and so on, they have actually shaped up really well."

Interestingly enough, negative talk did not disappear but stayed also at a relatively high level of frequency. The authors call this "expansion by enrichment" (Engeström, Engeström, & Suntuo, 2002).

Another way to assess the outcomes of Change Laboratory interventions is to trace the formation and implementation of novel theoretical concepts. A Change Laboratory conducted in a commercial bank led to

the construction of what the researchers characterize as "a perspectival concept" in which the practitioners envisioned and represented two desirable systems of their work, a near-future one and a more distant future model. Crucial to such collective concept formation is that the future models are named, depicted with the help of systemic models, and elevated to concreteness by means of identifying and actually implementing practical steps toward their realization (Engeström, Pasanen, Toiviainen, & Haavisto, 2005).

### Designing and Implementing Activities as Idiocultures: The 5th Dimension

A distinctive characteristic of a good deal of American intervention research within the CH/AT tradition is that it takes cultural variation and the social creation of social inequality as a central concern, drawing upon anthropological and sociological ideas about culture and context to design and implement interventions. The notion of culture that informs this line of work is an amalgam of American cultural anthropology (D'Andrade, 1984; Goodenough, 1994) and the ideas of the original Russian CH/AT theorists and their successors (Cole, 1996); culture is treated as a special kind of medium, constituted of ideal/material artifacts assembled as part of the behavioral patterns manifested in social practices along with their associated values and beliefs. On any given occasion ("according to the context") a subset of these resources is recruited as instruments for achieving the objectives of those involved. The design challenge, from this perspective, is to create new kinds of activities that promote the desired form of development and are suitable for a given social group at a particular time and place.

The particular intervention we describe in detail is called a 5th Dimension. At the most abstract level, a 5th Dimension intervention can be represented by a triangle (see Figure 23.3), with the 5th Dimension

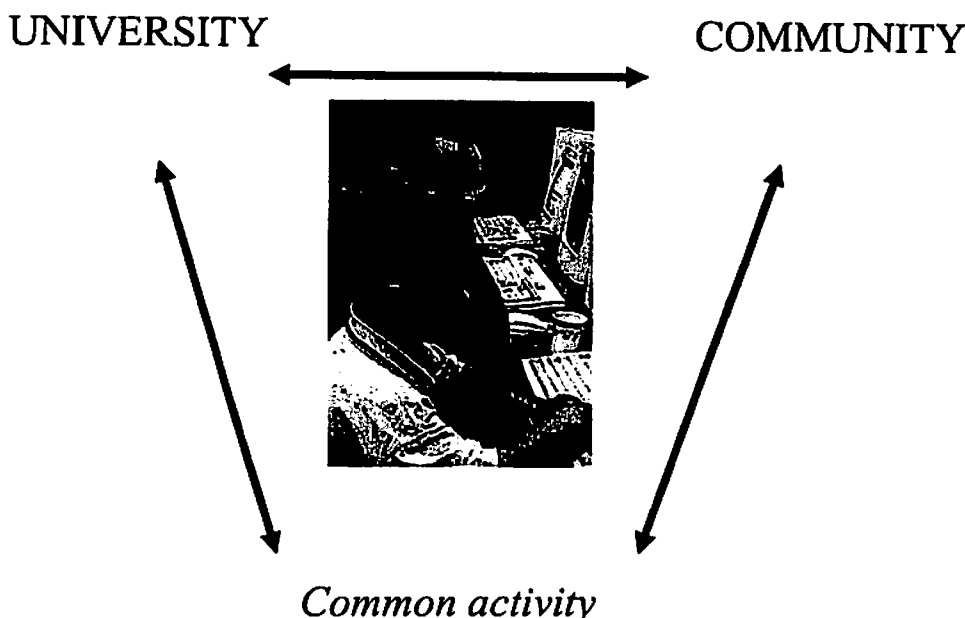


Figure 23.3. The basic organization of joint activity between a university and a community institution.

Activity System mediating the interaction of two institutions; a university (or college) and another organization in its community.

At a next level of abstraction, each part of the overall system can be differentiated (see Figure 23.4).

These two diagrams make it clear that the 5th Dimension is a medium for joint activity between two institutions that collaborate in its implementation and ongoing care. What is hinted at, but not clear in the diagram, is that when we move to the level of implementation, the spatial symmetry of the triangular design architecture obscures an important reality: as an *idioculture*, the 5th Dimension has to be located *somewhere*. As a rule, that "somewhere" has been in a community institution that cares for K-6 children after school, but 5th Dimensions have also been implemented at the local university in some cases. For purposes of simplicity, we focus on implementations of 5th Dimensions that are physically located in a particular community organization with joint participation by children and adults from both of the cooperating institutions.

### The Social-Ecology of 5th Dimensions

Most, but not all, 5th Dimensions have been implemented during the after school hours with the overall goal of providing children development-enhancing experiences, particular activities associated with intellectual and social development (Cole, 1996; Distributed Literacy Consortium, 2006; Vasquez, 2002). Consequently, 5th Dimensions are, from the perspective of participants, suspended in the temporal gap between school and home while at the same time they are mediating between a local community institution and a University that is both inside and outside the community (as indicated by the eternal rhetoric of town-gown relationships).

A conspicuous characteristic of the community organizations that host children after school is that their resources are sufficient to keep children off of the streets and out of trouble, but they rarely have the resources to make their activities rich in developmental/intellectual potential. Yet, they espouse intellectual development (coded as education) as a major goal.

This combination of attributes suggests the basis of reciprocity between university and community organizations that motivates their collaboration in creating 5th Dimensions. From a University perspective, the community organization that provides space and regularly present children also provides the university and its students a laboratory setting needed by their students. From the perspective of a community organization, the University is providing it valued resources to accomplish its goals.

### Designing the Joint Activity

We concentrate here on the design of the joint activity and the way in which it provides tests of various theoretical principles. From what has been said so far, the following characteristics of the joint activity emerge.

1. It is voluntary, at least in the sense that the state does not require children to go to afterschool programs, and within those programs, no one requires the children to participate in the 5th Dimension.

sion. Children come and go as they please.

2. It involves the mixing of leading activities because afterschool is a time in the day when children are often allowed to play, yet adults want them to be learning. In addition to mixing play and education, it emphasizes affiliation because the social and emotional bonds between undergraduate children provide a powerful foundation of their participation in the 5th Dimension.
3. It is multi-generational in three important senses. First, when speaking of the children and the undergraduates, age and educational expertise differentiate the participants. Second, when speaking of researcher/professors and children, the undergraduates are an "intermediate" generation with whom it is attractive and easy for the children to interact. Third, when speaking of length of participation in the idioculture of the 5th Dimension, the children are often of an older, and more experienced, generation of the members, so they are the more capable peers.

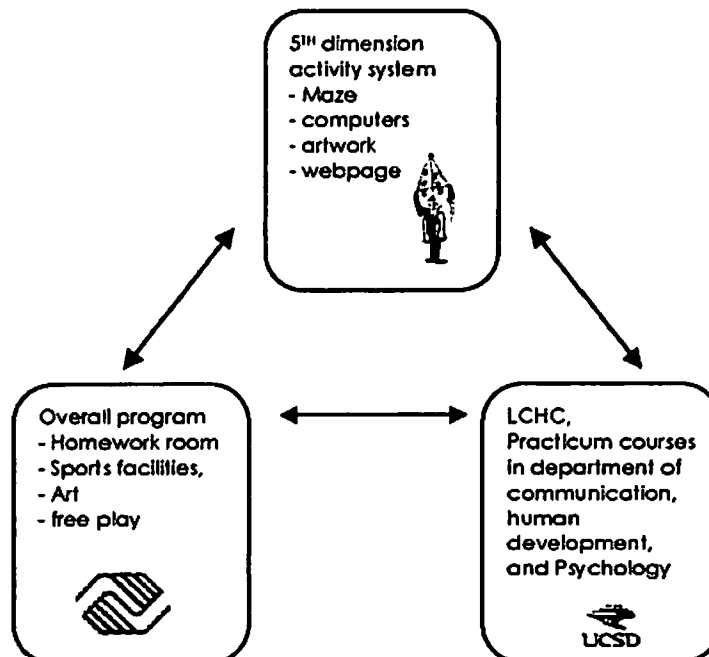


Figure 23.4. The University-Community partnership expanded to include its constituent parts.

4. It occurs across a span of as many years so long as it continues to be sustained. This long time span allows one to study cycles of activity as they are influenced by such factors as changes in the school calendar, the continuities and discontinuities in participation structures, secular changes in technology, financial support, etc. It is also possible to study several levels of the activity system ranging from the minute to minute interactions within the 5th Dimension, to changes in children over months and years, undergraduates over quarters and semesters, the overall structure of the joint activity over and its supporting institutional arrangements over years.

### Describing the Ideal-Type

A major expectation is that the particular activity system that arises under the constraints described thus far will differ from each other in a myriad of ways. However, over time it seems possible to discern a more or less stereotypical description of a 5th Dimension in a given U-C Partnership system of the sort one might use in a description made available to parents. The following description has been used in several publications for this purpose (e.g., Brown & Cole 2004).

The 5th Dimension is an educational activity system that offers school aged children a specially designed environment in which to explore a variety of off-the-shelf computer games and game-like educational activities during the after school hours. The computer games are a part of a make-believe play world that includes non-computer games like origami, chess, Boggle, and a variety of other artifacts.

College or university students enrolled in a course focused on fieldwork in a community setting play, work, and learn as the children's partners. In assisting children, the students are encouraged to follow the guideline: Help as little as possible but as much as nec-

essary for the child to have fun and make progress. The presence of college or university undergraduates is a major draw for the children.

As a means of distributing the children's and undergraduates' use of the various games, the 5th Dimension contains a tabletop or wall chart maze consisting of some a number of rooms, initially 20 (see Figure 23.5). Each room provides access to two or more games, and the children may choose which games to play as they enter each room.

Games are played using "task cards" written by project staff members for each game. They fulfill several goals. They are designed to help participants (both children and undergraduate students) orient to the game, to form goals, and to chart progress toward becoming an expert. They provide a variety of requirements in addition to the intellectual tasks written into the software or game activity itself. These additional requirements routinely include having participants externalize their thinking and learning or reflect upon and criticize the activity, sometimes by writing to someone, sometimes by looking up information in an encyclopedia, or by teaching someone else what one has learned.

There is an electronic entity (a wizard/wizardess/Maga, Golem, Proteo, etc.) who is said to live in the Internet. The entity writes to (and sometimes CH/ATs with) the children and undergraduates via the Internet and they write back. In the mythology of the 5th Dimension, the electronic entity acts as the participants' patron, provider of games, mediator of disputes, as well as the source of computer glitches and other misfortunes.

Because it is located in a community institution, the 5th Dimension activities require the presence of a local "site coordinator" who greets the participants as they arrive and supervises the flow of activity in the room. The site coordinator is trained to recognize and support the pedagogical ideals and curricular practices that mark the 5th Dimension as "different"—a different way for kids to use computers, a different way of playing

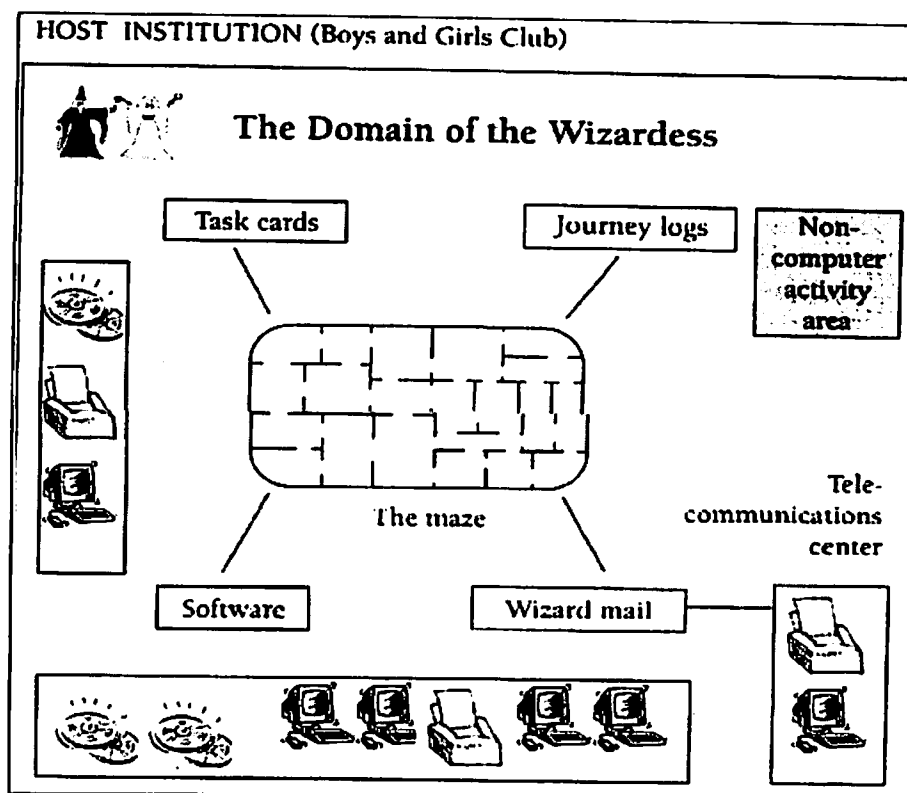


Figure 23.5. A schematic representation of a Fifth Dimension.

with other children, and a different way of interacting with adults.

### Evaluating the Intervention

There have been a great variety of analytical methods used to evaluate the usefulness and shortcomings of CH/AT principles in the design of 5th Dimensions (Blanton, Moorman, Hayes, & Warner, 1997; Distributed Literacy Consortium, 2006; Mayer, Schustack, & Blanton, 1999). These methods include specially designed tests that sample forms of knowledge and skill that make up the explicit content of the activities, questionnaires, indices of the monetary support provided by both the University and Community institutions, videotaped records of extended episodes of interaction between undergraduates and children engaged in various local practices, and data mining of stu-

dent fieldnotes, which number more than 26,000 between 1990 and 2005.

The specific data sources used by different implementers of a 5th Dimension (approximately 40 different research groups from different parts of the world) depend heavily upon the expectations of their local communities, the professional criteria of the academic disciplines they answer to, the specific interests of the investigator, and the resources available to them (see Distributed Literacy Consortium, 2006 or consult [www.uclinks.org/Resources](http://www.uclinks.org/Resources) for access to detailed reports).

Looking first to the activity systems as a whole, perhaps the most obvious result is that the idioculture that forms is highly sensitive to local constraints and resources. No two 5th Dimensions, even when implemented by the same researcher with the same group of students in two community organizations of the same kind in highly



similar communities, look like replicas of each other. Many common features are evident – the mixture of play and education, a friendly, but often-contentious welter of overlapping social interactions, the presence of some common games and routines. But within a period of months, if not weeks, each idioculture takes on its own characteristics, a blend of values, norms, and practices characteristic of the local institution (its staffing, architectural structure, its location in the community, etc.) and its University partners (who may be from backgrounds in education or linguistics, sophomores or seniors, predominantly of one ethnic group or several, etc.).

Tracing implementations in widely disparate conditions quickly reveals that some 5th Dimensions have failed to survive initial meetings between universities and potential community sponsors. Others have been implemented and run successfully, only to cease operation after less than a year as a result of inability to satisfy institutional imperatives that went undetected in the startup phase (for example, the inability of staff to keep track of the turnover of undergraduate participants owing to a university employing a quarter system combined with strict regulations about the presence of “strangers” at an afterschool program). Others have continued to a point where the two collaborating institutions discover that they do not really share a common vision of a good developmental environment for children or when the level of continuity in staffing (on either the university or community side) is inadequate, degrading the quality of the ensuing activity. Still others have continued for several years, but coincidence of several “risk factors” (decreased funding, loss of key personnel in two or more parts of the system) have led to their demise despite their recognized value. Finally, many implementations prosper and increase in scope, sometimes “giving birth” to new generations of 5th Dimensions. At the time of this writing, 28 years after the experiment began, dozens of 5th Dimensions and their associated university-community superstructures are in operation.

In evaluating the success of the design principles for promoting children’s development, the logic of evaluating developmental processes and the logic of evaluating development products have, from the beginning, been in constant tension. Whenever there is voluntary participation there is the probability that selection factors are in play. However, in some socio-ecological circumstances plausible comparison groups can be constituted and wherever this has been possible, 5th Dimensions have been shown to improve academic achievement of a variety of kinds. From a CH/AT perspective, this information tells us little about the *process* of development, but it does provide evidence sought by the University and the Community that the outcomes of whatever processes are at work meets their criteria for the *products* they are seeking. Without such evidence, it is more difficult to coax support from University and Community administrators.

Some investigators have combined a strategy of giving tests that are interpreted as objective measure of performance changes with analyses of field notes and videotapes that provide evidence about the processes that produce the test results. When such analyses have been carried out, they reveal the ways that organization of 5th Dimension idiocultures routinely encourages the kinds of mediated joint activity between more and less capable peers that results in mastery of intellectual content, motivation to solve difficult problems, and increased skill at collaboration-in-the-service-of-learning that provide plausible explanations for changes in tested performance.

In short, 5th Dimension idiocultures routinely create an institutionalized version of a zone of proximal development for participants. Unlike the educational and pretend play interactions discussed by Vygotsky, in the 5th Dimension there is often creative confusion about who the more capable peers might be (for example, when novice undergraduates encounter children highly skilled in playing educational computer games about which they know nothing). But the general culture of collaborative

learning that is created within the 5th Dimension appears to serve the development of all.

There have been several kindred interventions strategies used by American CH/AT theorists to design interventions that seek to incorporate cultural variation associated with the culture of a local social group into the design of activities. Thus, for example, Carol Lee has re-organized classroom discourse in high-school literature classes where students are predominantly African-American using literature in which distinct African-American speech genres are prominent as the starting point of the curriculum (Lee, Spencer, & Harpalani, 2003).

### Assessing CH/AT in Practice

We began by introducing an approach to culture and human development that prizes the testing of cultural-historical, activity-based approaches in practice. We end by comparing the three research programs we used as examples and by discussing how a CH/AT approach fits into the broader landscape of culturally informed developmental interventions. Each of the three examples uses a distinctively different mixture of CH/AT principles in the design and implementation of its intervention strategies as researchers seek to grapple with the specific cultural, institutional, and historical circumstances in which their interventions take place.

The Elkonin-Davydov research program came into existence during the 1960s in the USSR and was directed at changes in formal education. It is distinctive for the heavy emphasis it places on the *conceptual content* that it seeks to develop, its focus on developing theoretical thinking, and its use of the idea of leading activities in organizing instruction that is motivating for its students. The starting point of this kind of intervention is a philosophical and historical reconstruction of the logic of the subject matter as a means of choosing the starting point and the logical sequencing of the curriculum. The intervention then requires that its imple-

menters develop age-appropriate activities that embody the "genetically primary" starting points and its subsequent concretizations mediated by algorithmic schemas and models. These activities and the mediating tools they employ must maintain children's interest while constantly challenging them to go beyond already-mastered stages of domain-relevant knowledge to discover and elaborate ever-more varied and complex generalizations appropriate to the conceptual domain.

As reported by Davydov and his colleagues, their mathematics curriculum, when properly implemented, engenders in children a theoretical approach to the subject matter that produces high levels of achievement as indicated by their ability to master higher levels of the mathematics curriculum at an earlier age and to generalize the knowledge they acquire to novel problems. Similar claims have been made for the teaching of grammar, a notoriously difficult subject to teach in elementary and middle school students (Markova, 1979).

Notably absent from reports of this research during the Soviet era were reports of what other aspects of children's behavior may have changed as a result of this curriculum. Rubtsov (1991), for example, demonstrated that children's understanding was improved by organizing presentation of problems to groups of children in such a way that their conceptual development was enhanced when the distribution of problem elements induced children to discover critical features of the conceptual content through collaborative problem solving. But Soviet classrooms were renowned for the rigid discipline and use of teacher-led pedagogical methods that one might think inimical to theoretical thinking.

Research in the Elkonin-Davydov tradition conducted following the demise of the USSR has done a good deal to reveal consequences of their instructional methods that they, themselves, did not highlight. Zuckerman (2003), for example, emphasizes the fact that implementation of the Elkonin-Davydov method does indeed engender a theoretical approach to learning in children,

but that this theoretical approach entails marked change in classroom discourse such that children directly challenge their teachers to come up with theoretically appropriate justifications for *their* statements about (say) a mathematical proof. Noting the reflective attitude that this form of curriculum develops in children, Zuckerman comments that "Developing reflection is as dangerous as experimenting in nuclear physics and genetic engineering, with an outcome just as uncertain" (2003: 195).

Zuckerman's comment raises the question of culture and development in a way quite different from that illustrated by the Elkonin-Davydov curriculum – what are the cultural norms in society such that such a curriculum can be implemented on a broad scale? Observations in classrooms around the globe reveal that encouraging intellectual challenges from their students is not widespread (Hiebert et al, 2003). It requires that teachers have strong command of their subject matter and are well trained in the use of the Elkonin-Davydov approach including its encouragement of reflective theoretical thinking. When such conditions are met, however, the results appear as impressive as those reported by Davydov and his Russian colleagues (Schmittau, 1993a, b).

Particularly worth mentioning in this regard is an application of the Elkonin-Davydov approach is reported by Hedegaard and Chaiklin (2005). Their work took place in a poor, Latino area of New York City in an afterschool setting and was focused on concepts from the social sciences. While no appropriate comparison is possible to similar children engaged in standard curricula, Hedegaard and Chaiklin report the same kinds of ability to make use of conceptual models and to generalize learning to novel examples that are reported by Davydov, Schmittau, and others. Aside from the fact that it took place in an afterschool setting which afforded less hierarchical relations between teachers and children, a notable aspect of this work was that it used locally significant concrete exemplars to fill in the abstractions the children were encouraged to master, thereby showing it is

possible to combine local culturally valued knowledge with universal conceptual content to the benefit of the children intellectual development.

Despite, its successful demonstration of the utility of CH/AT principles in practice, the Elkonin-Davydov research program has yet to gain wide acceptance. This outcome, as we shall see, is relevant to evaluating the other two research programs that have been the focus of our attention.

The Change Laboratory came into being as part of a research program focused on adult work. It is distinctive in its focus on using the principle of dual stimulation as a method of providing adult workers with tools to become agents of change within their own workplaces. The Change Laboratory interventions currently face at least two intertwined challenges. First, the diffusion, generalization, and sustainability of the outcomes of single laboratories are problematic. Traditional social science notions of generalizability and sustainability easily lead to the expectation that forms of intervention and their outcomes should remain essentially unchanged over time and across sites, at the very least, for a given kind of work and institutional setting. From a CH/AT perspective, this is clearly a misguided expectation; culturally organized social innovations are dynamic systems of activity that require constant reconfiguration to stay alive. But how are researchers supposed to trace, document and assess such dynamic processes of generalization and sustained development?

A second challenge arises from the very core of the method of dual stimulation. Vygotsky and his colleagues saw dual stimulation as the basic mechanism of formation of voluntary action and will. In contemporary parlance, they sought to understand the role of agency in development. In a manner that bears clear analogies to dilemmas facing the Elkonin-Davydov formative experiments, it is likely that the most important outcomes of Change Laboratory interventions are changes in the collective agency of the participants, understood as their ability to challenge existing conditions and to

initiate change processes. These change processes, if they became general, would shake the foundational assumptions of their institutions – the workplace in the case of the Change Laboratory, the School in the case of the Elkonin-Davydov curriculum. From a methodological point of view we need to understand how the formation of new kinds of collective agency can be conceptualized and empirically identified. And from a larger, societal, point of view we need to understand the cultural-historical conditions that will permit such forms of collective agency to become general in society.

In addition, the successes of the Change Laboratory in Finland, a country which retains a relatively strong notion of social welfare in a world increasingly dominated by neo-liberal forms of economic and political organization raise the question of how even the research program carried out there can be generalized to countries such as the United States where privatization and short-term profit dominate work practices. As we have emphasized, the kind of formative interventions demanded by the logic of CH/AT research must be carried out over significant periods of time and involve significant expenditures. By contrast, the typical managerial consulting practices in the United States are short term and increasing the collective agency of the workers is unlikely to win the consultants an invitation to return. Once again, the macro socio-cultural features of the society place clear restrictions on potential generalization of demonstrably successful applications of theory in practice.

The same dilemmas, in somewhat different form, confront projects such as the 5th Dimension, which arose as a means of creating inter-institutional joint activities focused on the design and implementation of developmental enrichment activities for children in the afterschool hours. It highlights the creation of idiocultures that bring together several CH/AT principles such as the method of dual stimulation and leading activities to create zones of proximal development. Like the Change Laboratory interventions, the principle that every instantiation of the

intervention will be, in principle, different in various ways from very other instantiation creates difficult problems of appropriate description and evaluation. It also deals with the issue of agency; who initiates the university-community collaborations? Whose voice dominates discussions of the activities that are the basis of joint activities between supporting institutions? Like the Elkonin-Davydov project it must struggle to create forms of activity that are appropriate to the (various) age characteristics, but unlike the Elkonin-Davydov project it does not restrict itself to well specified conceptual domains, opting instead to provide a variety of contents embodied in a variety of age-appropriate games and problem solving tasks in order to deal with the enormous variety of its participants.

While there is little doubt that 5th Dimensions more or less routinely succeed in creating genuine zones of proximal development for their participants, this project shares with Change Laboratory severe challenges concerning how to describe and evaluate the dynamic, always-in-change characteristics of the activity systems it creates. Current social science norms expect unambiguous quantifiable descriptions such as those provided by standardized tests or measure of "output." But the voluntary nature of participation and the always-variable nature of implantations, dependent on their contexts, defy such standardized assessments. And, like the Change Laboratories, those who would use the 5th Dimension to challenge CH/AT theories turn to "real life" measures of effectiveness: Does the community provide resources to continue the collaborations between university and community? Do 5th Dimensions generalize from their institutions of origin? Are they taken up (generalized to) distinctly different social, cultural and economic circumstances? And if they are, do they remain "the same" despite the changes in content and context?

Taken as an ensemble, these three formative interventions indicate the fruitfulness of a theory-practice methodology using CH/AT principles. At the same time, each faces challenges to its own sustainability.

Those challenges are, to a certain extent, specific to the problematic conditions that each was designed to address (e.g., poor education, difficulties in the organization of working life). But common across all three kinds of formative interventions is resistance that arises when their successes come into conflict with the large social conditions that underlie the social problems they were designed to transcend. It is at this point that each intervention can be recognized as a form of critical theorizing about existing conditions in the societies they are a part of. Each reveals ways in which the explicit ideologies of modern industrialized bureaucratized societies espouse values (guaranteeing all children high quality education, creating effective, fulfilling environments for adult work) that they systematically undermine. Finally, each provides society with alternatives that satisfy their society's values, showing that while there is a way to solve explicitly stated social problems, there is, in a deep sense, a lack of will to do so.

## Notes

- 1 There are also different branches of the Russian activity theory tradition, with adherents of Rubenshtein (Abulkhanova-Slavsakaya, 1989) claiming a more authentically Marxist theory of activity than that proposed by Leontiev and his students. Presumably those inspired by Rubenshtein would have their own tradition of designing environments for developing human life but we do not know that literature well and will restrict ourselves to the use of activity following from the tradition of Vygotsky, Luria, and Leontiev.
- 2 The Russian word, "deyatelnost" is generally translated from the German term, Tätigkeit.
- 3 "To understand behavior, one must understand the history of behavior," an aphorism that expresses this idea admirably, was attributed to the educational psychologist, Pavel Blonsky by Vygotsky (1978).
- 4 It is a mistake to interpret leading activities under the assumption that when a new leading activity begins to dominate, the prior ones disappear, as occurs in some treatments of classical stage theories. Old stages don't go

away, they shape and are shaped by future, emerging, constraints (Cole & Subbotsky, 1993; Griffin & Cole, 1984).

- 5 The Russian term, *obuchenie*, is often translated as education. We prefer the somewhat awkward translation, teaching/learning, because both sides of this interactive process are implicated in the Russian term. There is a more general term in Russian, *obrazovanie*, which is a closer equivalent to the English term, education.
- 6 The approach developed by Davydov and Elkonin has been given different names since its inception in the 1960's. Early on it was referred to as "teaching/learning based on content-related generalizations," then as "educational activity" and later as "developmental education."

## References

- Abulkhanova-Slavsakaya, K. A. (1989). To Sergei Rubinstein birth centenary: A profile of Sergei Rubinstein's life and work. *Soviet Journal of Psychology*, 10(5), 16-28.
- Ahonen, H., Engeström, Y., & Virkkunen, J. (2000). Knowledge management – the second generation: Creating competencies within and between work communities in the Competence Laboratory. In Y. Malhotra (Ed.), *Knowledge management and virtual organizations* (pp. 282-305). London: Idea Group Publishing.
- Amano, K. (1999). Improvement of schoolchildren's reading and writing ability through the formation of linguistic awareness. In Y. Engeström, R. Mietinen, & R.-L. Punamäki (Eds.), *Perspectives on activity theory* (pp. 183-205). Cambridge: Cambridge University Press.
- Blanton, W. E., Moorman, G. B., Hayes, B. A., & Warner, M. L. (1997). Effects of participation in the 5th Dimension on far transfer. *Journal of Educational Computing Research*, 16(4), 371-96.
- Brown, K. B., & Cole, M. (2004). A utopian methodology as a tool for cultural and critical psychologies: Toward a positive critical theory. In M. Packer & M. Tappan (Eds.), *Cultural and critical perspectives on human development* (pp. 41-65). Albany, NY: SUNY Press.
- Cole, M. (1996). *Cultural psychology: A once and future discipline*. Cambridge, MA: Harvard University Press.

- Cole, M., & Subbotsky, E. (1993). The fate of stages past: Reflections on the heterogeneity of thinking from the perspective of cultural-historical psychology. *Schweizerische Zeitschrift für Psychologie*, 52(2), 103-113.
- D'Andrade, R. (1984). Cultural meaning systems (1984). In R. A. Shweder & R. A. LeVine (Eds.), *Culture theory: Essays on mind, self, and emotion* (pp. 88-122). New York: Cambridge University Press.
- Davydov, V. V. (1988a). Problems of developmental teaching. *Soviet Education*, 30(8), 15-97; 30(10), 3-77.
- Davydov, V. V. (1988b). Problems of the child's mental development. *Soviet Education*, 30(8), 44-97.
- Davydov, V. V. (1988c). The concept of developmental teaching. *Journal of Russian and East European Psychology*, 36(4), 11-36.
- Distributed Literacy Consortium (2006). *Creating and sustaining alternative educational activities: Diversity as a tool for educational design*. New York: Russell Sage.
- Elkonin, D. B. (1971). Toward the problem of stages in the mental development of the child. *Soviet Psychology*, 10, 538-553.
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.
- Engeström, Y. (1993). Developmental studies on work as a test bench of activity theory. In S. Chaiklin & J. Lave (Eds.), *Understanding practice: Perspectives on activity and context* (pp. 64-103). Cambridge: Cambridge University Press.
- Engeström, Y. (1999). Learning by expanding: Ten years later. Introduction. *Lernen durch Expansion*. Marburg: BdWi-Verlag.
- Engeström, Y. (2001). (Ed.). *Activity theory and social capital. Research Reports 5*. Helsinki: Center for Activity theory and Developmental Work Research, University of Helsinki.
- Engeström, Y. (2005). *Developmental work research: Expanding activity theory in practice*. Berlin: Lehmanns Media.
- Engeström, Y., Engeström, R., & Kerosuo, H. (2003). The discursive construction of collaborative care. *Applied Linguistics*, Special Issue 24(3), 286-315.
- Engeström, Y., Engeström, R., & Suntio, A. (2002). From paralyzing myths to expansive action: Building computer-supported knowledge work into the curriculum from below. In G. Stahl (Ed.), *Computer support for collaborative learning: Foundations for a CSCL community* (pp. 318-324). Mahwah, NJ: Lawrence Erlbaum.
- Engeström, Y., Lompscher, J., & Rückriem, G. (Eds.). (2005). *Putting activity theory to work: Contributions from developmental work research*. Berlin: Lehmanns Media.
- Engeström, Y., Miettinen, R., & Punamäki, R.-L. (Eds.). (1999). *Perspectives on activity theory*. Cambridge; New York: Cambridge University Press.
- Engeström, Y., Pasanen, Toivainen, H., & Haavisto, V. (2005). Expansive learning as collaborative concept formation at work. In K. Yamazumi, Y. Engeström & H. Daniels (Eds.), *New learning challenges: Going beyond the industrial age system of school and work* (pp. 47-77). Osaka: Kansai University Press.
- Engeström, Y., Virkkunen, J., Helle, M., Pihlaja, J., & Poikela, R. (1996). The Change laboratory as a tool for transforming work. *Lifelong Learning in Europe*, 1(2), 10-17.
- Fine, G. A. (1987). *With the boys: Little League baseball and preadolescent culture*. Chicago: University of Chicago Press.
- Gaskins, S. (1999). Children's daily lives in a Mayan village: A case study of culturally constructed roles and activities. In A. Goncu, (Ed.), *Children's engagement in the world: Sociocultural perspectives* (pp. 25-60). New York: Cambridge University Press.
- Goodenough, W. H. (1994). Toward a working theory of culture. In R. Borofsky (Ed.), *Assessing cultural anthropology* (pp. 262-273). New York: McGraw-Hill.
- Griffin, P., & Cole, M. (1984). Current activity for the future: The zooped. In B. Rogoff & J. V. Wertsch (Eds.), *Children's learning in the zone of proximal development: New directions for child development* (No. 23). San Francisco: Jossey-Bass.
- Hartman, H. J. (Ed.). (2001). *Metacognition in learning and instruction: theory, research and practice*. Boston: Kluwer Academic Publishers.
- Hedegaard, M., & Chaiklin, S. (2005). *Radical-local teaching and learning: A cultural-historical approach*. Aarhus: Aarhus University Press.
- Hedegaard, M., Chaiklin, S., & Jensen, U. J. (Eds.). (1999). *Activity theory and social practice*. Aarhus: Aarhus University Press.
- Hedegaard, M., & Lompscher, J. (Eds.) (1999). *Learning activity and development*. Aarhus: Aarhus University Press.
- Hiebert, J., Gallimore, R., Garnier, H., Given, K. B., Hollingsworth, H., Jacobs, J., et al. (2003). *Teaching mathematics in seven*

- countries: Results from the TIMSS 1999 video study. Washington, DC: U.S. Department of Education.
- Ilyenkov, E. V. (1982). *The dialectics of the abstract and the concrete in Marx's 'Capital'*. Moscow: Progress.
- Kaminski, P. H. (1994). Claiming our voices: A teaching/learning experiment. *Journal of Feminist Studies of Religion*, 10(1), 44-56.
- Kaptelinin, V. (1996). Computer-mediated activity: Functional organs in social and developmental contexts. In B. Nardi. (Ed.), *Context and consciousness: Activity theory and human-computer interaction* (pp. 45-68). Cambridge, MA: The MIT Press.
- Lee, C. D., Spencer, M. B., & Harpalani, V. (2003). "Every shut eye ain't sleep": Studying how people live culturally. *Educational Researcher*, 32(5) 6-13.
- Leontiev, A. N. (1978). *Activity. Consciousness. Personality*. Englewood Cliffs, NJ: Prentice Hall.
- Leontiev, A. N. (1981). The problem of activity in psychology. In J. V. Wertsch (Ed.), *The concept of activity in Soviet Psychology* (pp. 37-71). White Plains, NY: Sharpe.
- Lotman, Y. M. (1989). The semiosphere. *Soviet Psychology*, 27(1), 40-61.
- Luria, A. R. (1928). The problem of the cultural development of the child. *Journal of Genetic Psychology*, 35, 493-506.
- Luria, A. R. (1932). *The nature of human conflicts*. New York: Liverwright.
- Luria, A. R. (1979). *The making of mind*. Cambridge, MA: Harvard University Press.
- Markova, A. K. (1979). *The teaching and mastery of language*. Armonk, NY: Sharpe.
- Mayer, R. E., Schustack, M. W., & Blanton, W. E. (1999). What do children learn from using computers in an informal, collaborative setting? *Educational Technology*, 39(2), 27-31.
- Nocon, H. D. (2004). Sustainability as process: Community education and expansive collaborative activity. *Educational Policy*, 18(5), 710-732.
- Rogoff, B. (2003). *The cultural nature of human development*. New York: Oxford University Press.
- Roth, W.-M., Hwang, S., Goulart, M. I. G., & Lee, Y. J. (2005). *Participation, learning, and identity: A dialectical perspective*. Berlin: Lehmanns Media.
- Rubtsov, V. V. (1991). *Learning in children: Organization and development of cooperation actions*. New York: Nova Science Publishers.
- Schmittau, J. (1993a). Connecting mathematical knowledge: A dialectical perspective. *Journal of Mathematical Behavior*, 12(2), 179-201.
- Schmittau, J. (1993b). Vygotskian psychology and dialectical logic: A psychological-epistemological foundation for contemporary pedagogy. *The Review of Education*, 15, 13-20.
- Schmittau, J. (2003). Cultural historical theory and mathematics education. In A. Kozulin, B. Gindis, S. Miller, & V. Ageyev. (Eds.), *Vygotsky's educational theory in cultural context* (pp. 225-245.). Cambridge, UK: Cambridge University Press.
- Sherif, M., & Sherif, C. W. (1956). *An outline of social psychology*. New York: Harper.
- van Der Veer, R., & Valsiner, J. (1991). *Understanding Vygotsky*. Oxford: Blackwell.
- Vásquez, O. A. (2002). *La Clase Mágica: Imagining Optimal Possibilities in a Bilingual Community of Learners*. Mahwah, NJ: Erlbaum.
- Virkkunen, J., & Ahonen, H. (2004). Transforming learning and knowledge creation on the shop floor. *International Journal of Human Resources Development and Management*, 4, 57-72.
- Vygotsky, L. S. (1929). The problem of the cultural development of the child, II. *Journal of Genetic Psychology*, 36, 414-434.
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Vygotsky, L. S. (1927/1997). The historical meaning of the crisis in psychology: A methodological investigation. In R. W. Rieber & J. Wollock. (Eds.), *The collective works of L. S. Vygotsky, Vol. 3: Problems of the theory and history of Psychology* (pp. 233-243). New York: Plenum.
- Vygotsky, L. S. (1997). The problem of consciousness. In R. W. Rieber & J. Wollock (Eds.) *The collective works of L. S. Vygotsky, Vol. 3: Problems of the theory and history of Psychology* (pp. 129-138). New York: Plenum.
- Wertsch, J. V. (1985). *Vygotsky and the social formation of mind*. Cambridge, MA: Harvard University Press.
- Wertsch, J. del Rio, & Alvarez, A. (Eds.) (1995). *Sociocultural studies of mind*. New York: Cambridge University Press.
- Yanchar, S. C. (2003). On methodological innovations in imagery research: Beyond the learning experiment? *Journal of Mental Imagery*, 27 (3 & 4), 258-261.
- Zinchenko, V. P. (1985). Vygotsky's ideas about units for the study of mind. In J. Wertsch.

- (Ed.), *Culture, communication, and cognition: Vygotskian perspectives*. New York, NY: Cambridge University Press.
- Zuckerman, G. A. (1994). The child's initiative in building up cooperation: the key to problems of children's independence. In J. J. F. ter Laak, P. G. Heymans, & A. Podol'skij. (Eds.), *Developmental tasks: Towards a cultural analysis of human development* (pp. 125-140). Dordrecht: Kluwer Academic.
- Zuckerman, G. A. (2003). The learning activity in the first years of schooling: The developmental path toward reflection. In A. Kozulin, B. Gintis, V. S. Ageev, & S. Miller. (Eds.), *Vygotsky's educational theory in cultural context*. New York: Cambridge University Press.
- Zuckerman, G. A. (2005). The D. B. Elkonin-V. Davydov system as a resource for raising the competence of Russian schoolchildren. *Problems of Psychology*, (4) 84-95